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ABSTRACT

This new 2003 edition updates the 2001 report on the implications of 50 major trends now shaping the future. Some of these trends will have a direct impact upon people's concerns, while others will help to form the general environment in which people live and work. The trends are divided into eight sections: (1) "General Long-Term Economic and Societal Trends" (Trends 1-7); (2) "Trends in Values, Concerns, and Lifestyles" (Trends 8-14); (3) "Energy Trends" (Trends 15-18); (4) "Environmental Trends" (Trends 19-24); (5) "Technology Trends" (Trends 25-30); (6) "Trends in Labor Force and Work" (Trends 31-41); (7) "Management Trends" (Trends 42-45); and (8) "Institutional Trends" (Trends 46-50). (BT)

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50 Trends Shaping the Future. (Special Report Published by the World Future Society).

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Special Report Published by the World Future Society

50 Trends Shaping the Future

By Marvin J. Cetron and Owen Davies

Introduction

For four decades, Forecasting International has conducted an ongoing study of the forces changing our world. Over the last decade, our expectations have proved gratifyingly accurate. For instance, we believed that the economy of the developed world would be much more vibrant than most commentators imagined possible, and so it has been. We also foresaw many of the political and social problems brought about by the changing population. In all, no fewer than 95% of our projections have proved correct.

This new edition updates our 2001 report on the implications of 50 major trends now shaping the future. Whatever your concern, some of these trends will have a very direct impact upon it. Others will help to form the general environment in which we live and work. They all merit attention from anyone who must prepare for what lies ahead.

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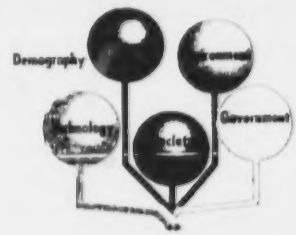

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General Long-Term Economic and Societal Trends

The economy of the developed world will continue to grow for at least the next five years. Any interruptions will be relatively short-lived.

• Less than a year after the terrorist attacks, the U.S. economy began rebounding strongly, with rises in personal income, consumer spending, retail sales, and industrial production. In the hard-hit tech sector, production was up fully 6% between May and June 2002. This is remarkably good news for an economy that pessimists feared would be on the ropes.

• Real estate has proved to be extraordinarily resilient in the United States, thanks to the lowest mortgage rates in the last 40 years. Record-breaking housing sales included many middle-income buyers, as well as large numbers from minority groups who traditionally have not participated strongly in this market.

• As other countries bring their economies under control over the next two or three years, growth will accelerate to something near the comfortable levels seen in recent years.

• With national debts under control throughout most of Europe, the euro has risen to parity against the U.S. dollar for the first time since the European Union floated its joint currency.

• The outlook for Europe remains mixed, but relaxation of borders within the European Union has brought new mobility to the labor force. This is making for a more efficient business environment on the Continent.

• According to the most recent figures, Japan's long-suffering economy is growing for the first time in years. Japan's central bank is working hard to lower the value of the yen on international markets, in hope of promoting exports and ensuring continued growth.

• This may be just the beginning for Japan. The banks' write-off of bad debts, coupled with better lending practices and other reforms, could set the stage for a long-awaited economic recovery in 2005. This would make Japan a much healthier trading partner for the West.

• In November 2001, China finally was admitted to the World Trade Organization. Among other beneficial mandates, this requires Beijing to cut away the obstacles that prevent small exporters from competing profitably in this potentially enormous market. As these reforms take effect, they will provide a welcome stimulus to the American economy.

• Many nations of the former Soviet Union are bringing order to their economies, proving themselves viable markets for goods from western Europe. Recently, even Russia appears to be stabilizing its economy, long the weakest link in its region. The discovery of oil in Kazakhstan and new interest in other countries in the region as potential partners in the war on terrorism should further this process.

• Worldwide, improved manufacturing technology will continue to boost productivity and reduce the unit cost of goods. At the same time, workers who remain on the job longer will offset slow growth in the labor force, while the globalization of business will keep pressure on salaries in the developed countries. Thus, both prices and wages should remain under control.

• However, there is one new trouble spot. The Brazilian economy—a mainstay of the Latin American region—had been much more resilient than some onlookers feared two years ago. Recently, that picture changed. Word that the Worker's Party candidate was in the lead for the Brazilian presidency drove the real to record lows on the global currency markets before the October 2002 election, while stock and bond markets also declined precipitously. Fears that the World Bank and IMF will withdraw their support suggest that the largest economy in South America could soon follow Argentina into default.

Implications: The current economic downturn is very likely to prove relatively short-lived. It will be

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Euros unite Europe, gaining parity with U.S. dollar.

Trend 1

followed by generally solid growth throughout the developed world for the remainder of this decade.

Economic unification will boost all manner of trade within Europe. In the long run, the newly capitalist lands of the former Soviet Union should be among the fastest growing new markets. In the longer term, India will expand faster than any other market in the world.

Labor markets will remain tight, particularly in skilled fields. This calls for new creativity in recruiting, benefits, and perks, especially profit sharing. This hypercompetitive business environment demands new emphasis on rewarding speed, creativity, and innovation within the workforce.

The growing concentration of wealth among the elderly, who as a group already are comparatively well-off, creates an equal deprivation among the young and the poorer old. This implies a loss of purchasing power among much of the population; in time, it could partially offset the forces promoting economic growth.

2 The world's population will double in the next 40 years.

• The greatest fertility is found in those countries least able to support their existing populations. Countries with the largest population increases between 2000 and 2050 include Palestinian territory (217%), Niger (205%), Yemen (168%), Angola (162%), the Democratic Republic of the Congo (161%), and Uganda (133%).

• Even these estimates may be much too low. According to the Center for Strategic and International Studies (CSIS), most official projections underestimate both fertility and future gains in longevity.

• In contrast to the developing world, many industrialized countries will see fertility rates below the replacement level and hence significant declines in populations, excluding the effects of immigration. This means that the population of the developed nations will fall from 23% of the total world population in 1950 and about 14% in 2000 to only 10% in 2050.

• In 10 years or so, the workforce in Japan and much of Europe will shrink by 1% per year. By the 2030s, it will contract by 1.5% annually.

Implications: Rapid population growth will reinforce American dominance of the global economy, as the European Union falls to third place behind the United States and China.

To meet human nutritional needs over the next 40 years, global agriculture will have to supply as much food as has been produced during all of human history.

Unless fertility in the developed lands climbs dramatically, either would-be retirees will have to remain on the job, or the industrialized nations will have to encourage even more immigration from the developing world. The third alternative is a sharp economic contraction and loss of living standards.

Barring enactment of strict immigration controls, rapid migration will continue from the Southern Hemisphere to the North, and especially from former colonies to Europe. A growing percentage of job applicants in the United States and Europe will be recent immigrants from developing countries.

Culture clashes between natives and immigrants are likely to destabilize societies throughout the developed world. Germany, Britain, and other lands traditionally welcoming to refugees and other migrants already are experiencing strong backlashes against asylum-seekers

3 The population of the developed world is living longer.

• Each generation lives longer and remains healthier than the last. Since the beginning of the twentieth century, every generation in the United States has lived three years longer than the previous one. An 80-year-old in 1950 could expect 6.5 more years of life; today's 80-year-olds are likely to survive 8.5 more years.

• Life expectancy in Australia, Japan, and Switzerland is now over 75 years for males and over 80 for females.

• A major reason is the develop-

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Seniors are served a hot meal by a group of volunteers. People throughout the developed world are living longer.

Trend 3

Rising Life Expectancy in Developed World

average years of life expectancy at birth:

	born 1950-1955	1995-2000
USA	68.9	76.5
U.K.	69.2	77.2
Germany	67.5	77.3
France	66.5	78.1
Italy	66.0	78.2
Canada	69.1	78.5
Japan	63.9	80.5

Source: United Nations (2001), cited in *The Global Retirement Crisis* by Richard Jackson. Center for Strategic and International Studies, www.csis.org. 2002.

Trend 3

ment of new pharmaceuticals and medical technologies, which are making it possible to prevent or cure diseases that would have been fatal to earlier generations. In many developed countries, credit also goes to government health programs, which have made these treatments available to many or all residents. In the developing lands, a primary cause is the availability of generic drugs, which cut the cost of care and make health affordable even for the poor.

- These figures are much too conservative because they assume that life expectancy will grow more slowly in the future, argues CSIS.
- Medical advances that slow the fundamental process of aging now seem to be within reach. They could well help today's middle-aged baby boomers live far longer than even CSIS anticipates today.
- Any practical extension of the human life span will prolong health as well and will reduce the incidence of late-life disorders such as cancer, heart disease, arthritis, and possibly Alzheimer's disease.

Implications: Global demand for products and services aimed at the elderly can only grow quickly in the coming decades.

Developed countries may face social instability as a result of competition for resources between retirement-age boomers and their working-age children and grandchildren. In the United States and other developed countries, public spending on retirement benefits could grow to one-fourth of GDP by 2050, even as the number of workers available to support each retiree declines sharply, according to CSIS.

Barring dramatic advances in geriatric medicine, the cost of health care is destined to skyrocket throughout the developed lands. This could create the long-expected crisis in health-care financing and delivery.

However, dramatic advances in geriatric medicine are all but inevitable. Paying the high cost of new drugs and technologies will reduce the cost of caring for patients who would have suffered from disorders eliminated or ameliorated by new therapies. In the end, cost increases and reductions should just about balance out, leaving the average American health-care bill nearly unchanged.

4 The elderly population is growing dramatically throughout the world.

- People over 65 made up only 8% of the population in the developed world in 1950, but 15% in 2000, and will grow to 27% of the population in the next half century, according to CSIS.
- Throughout the developed world, population growth is fastest among the elderly. In Europe, the United States, and Japan, the aged also form the wealthiest segment of society.
- The world's over-60 population will reach 1 billion by 2020, 13.3% of the projected world total. Three-fourths will be in developing countries, principally China, India, Brazil, Indonesia, and Pakistan.
- In Germany, the retirement-age population will climb from under 16% of the population in 2000 to nearly 19% in 2010 and 31% in 2050.
- Japan's over-65 population made up 17% of the total in 2000 and is projected to rise to 22% in 2010 and nearly 37% in 2050.

Implications: Not counting immigration, the ratio of working-age people to retirees needing their support will drop dramatically in the United States, Germany, Italy, Russia, and Japan by 2050. This represents a burden on national economies that will be difficult to sustain under current medical and social security systems.

Global Aging

percentage of population aged 65 and older:

	1950	2000	2050
Developed World	8%	15%	27%
Developing World	4%	6%	14%

Source: United Nations (2001), cited in *The Global Retirement Crisis* by Richard Jackson. Center for Strategic and International Studies, www.csis.org. 2002.

Trend 4

The United States in particular will need more doctors specializing in diseases of the elderly—at least double the 9,000 now available. Yet, by 2030, the number of certified American geriatric specialists is expected to decline dramatically.

The nursing shortage is another problem that is severe today and will grow much worse as the senior population expands. In all, the United States will be short 515,000 nurses by 2020, just as senior baby boomers begin to flood the health-care system. State health-care agencies will be forced to take the lead in recruiting new workers to this critical field.

5 The growth of the information industries is creating a knowledge-dependent global society.

- Information is the primary commodity of more and more industries.
- By 2005, 83% of American management personnel will be knowledge workers. Europe and Japan are not far behind.
- The Internet makes it possible for small businesses throughout the world to compete for market share on an even footing with industry leaders.
- In the United States, the "digital divide" seems to be disappearing. In early 2000, a poll found that, where half of white households owned

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Hispanic family bridges the digital divide, though Hispanics continue to lag behind other U.S. households in computer ownership.

Trend 5

computers, so did fully 43% of African-American households, and their numbers were growing rapidly. Hispanic households continued to lag behind, but their rate of computer ownership was expanding as well.

- By 2005, the average PC workstation will combine a computer, a fax, a picture phone, and a duplicator—possibly in one unit—for less than $2,500 (in 1995 dollars). The picture will appear on a flat screen of 20 inches by 30 inches. By 2006 or so, these systems will include real-time voice translation, so that conversations originating in one of seven or eight common languages can be heard in any of the others.
- Computer competence will approach 100% in U.S. urban areas by 2005. Cities in Europe and Japan will achieve universal computer literacy shortly thereafter.

Implications: Knowledge workers are generally better paid than less-skilled workers, and their proliferation is raising overall prosperity. Even entry-level workers and those in formerly unskilled positions require a growing level of education. For a good career in almost any field, computer competence is mandatory. This is one major trend raising the level of education required for a productive role in today's workforce. For many workers, the opportunity for training is becoming one of the most desirable benefits any job can offer.

New technologies create new industries, jobs, and career paths, which can bring new income to developing countries. An example is the transfer of functions such as technical support in the computer industry to Asian divisions and service firms.

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Knowledge worker at work: Future workstations will streamline technologies into sleek, multipurpose devices.

Trend 5

6 Growing acceptance of cultural diversity, aided by the unifying effect of mass media, is promoting the growth of a truly integrated global society. However, this is subject to local interruptions and reversals.

- Information technologies promote long-distance communication as people hook up with the same commercial databases and computer networks, and above all with the Internet.
- Within the United States and Europe, regional differences, attitudes, incomes, and lifestyles are blurring as business carries people from one area to another.
- Intermarriage also continues to mix cultures geographically, ethnically, socially, and economically.
- Minorities are beginning to exert more influence over national agendas as the growing number of African Americans, Hispanics, and Asians in the United States is mirrored by the expanding population of refugees and former "guest workers" throughout Europe.
- In the United Kingdom, 21% of young adults answering a recent poll viewed themselves as primarily European rather than British. Some 31% of French Gen X'ers, 36% of Germans, and 42% of Italians also said they thought of themselves as primarily European.
- However, in many countries there are powerful reactions against these changes. The growth of the

German neo-Nazi movement is one obvious example.

Implications: Over the next half century, growing cultural exchanges at the personal level will help to reduce some of the conflict that plagued the twentieth century. However, this is likely to produce a violent backlash in societies where xenophobia is common. Some of the most fervent "culturist" movements will spring from religious fundamentalism. Would-be dictators and strongmen will use these movements to promote their own interests, ensuring that ethnic, sectarian, and regional violence will remain common. Terrorism especially will be a continuing problem.

Companies will hire ever more minority workers and will be expected to adapt to their values and needs. Much of the burden of accommodating foreign-born residents will continue to fall on employers, who must make room for their languages and cultures in the workplace.

However, the greatest responsibility will continue to fall on two public institutions: schools and libraries. Primary concerns for U.S. schools include providing all students with a solid grounding in English and finding ways to recruit and reward the best teachers and weed out the least effective. Public libraries act as sites for after-hours learning, reference facilities, sources of Net access for those who do not have it at home, and bad-weather shelters for the homeless. They, too, require greater support.

7 The global economy is growing more integrated.

• Rather than paying salaries and benefits for activities that do not contribute directly to the bottom line, companies are farming out secondary function to suppliers, service firms, and consultants, which increasingly are located in other countries.

• In the European Union, relaxation of border and capital controls and the use of a common currency are making it still easier for companies to farm out support functions throughout the Continent.

• The Internet and cable-TV home shopping channels have brought retailers and manufacturers closer to distant customers, who had been out of reach. This is reshaping distribution patterns in many retail industries.

• New procurement regulations and standards promise to open the government market to suppliers who previously found the bidding process too difficult, costly, or just confusing.

Implications: Demand for personnel in distant countries will increase the need for foreign-language training, employee incentives suited to other cultures, aid to executives going overseas, and the many other aspects of doing business in other countries. As eastern Europe integrates more fully with the European Union, a major investment in personnel development will be needed over the next few years.

The growth of commerce on the Internet makes it possible to shop globally for raw materials and supplies, thus reducing the cost of doing business. In niche markets, the Internet also makes it possible for small companies to compete with giants worldwide with relatively little investment.

In the wake of the "Asian flu," Western companies may have to accept that proprietary information will be shared, not just with their immediate partners in Asian joint ventures, but with other members of the partners' trading conglomerates. In high technology and aerospace, that may expose companies to extra scrutiny, due to national-security concerns.

Trends in Values, Concerns, and Lifestyles

8 Societal values are changing rapidly.

• Industrialization raises educational levels, changes attitudes toward authority, reduces fertility, alters gender roles, and encourages broader political participation. This process is just beginning throughout the developing world, point out social researchers Ronald Inglehart and Wayne E. Baker (THE FUTURIST, March-April 2001).

• Developed societies will increasingly take their cue from generations

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Youth on the move in Italy. Younger generations increasingly have more in common with their counterparts around the world than they do with their own parents.

Trend 8

X and dot-com, rather than the baby boomers who have dominated western thinking for most of four decades. This will tend to homogenize certain basic attitudes throughout the world, because Gen X'ers and especially dot-coms around the globe have more in common with each other than with their parents.

• In the future, both self-reliance and cooperation will be valued—self-reliance because we will no longer be able to fall back on Social Security, pensions, and other benefits; cooperation because group action often is the best way to optimize the use of scarce resources, such as retirement savings.

• Post–September 11 worry over terrorist attacks have led Americans to accept almost without comment security measures that their vaunted love of privacy once would have made intolerable. This continues a long-established tendency in the United States to prefer a greater sense of safety at the cost of greater government surveillance and intervention in their lives.

• Once national-security issues lose their immediacy, family issues will again dominate American society, at least through 2008: long-term health care, day care, early childhood education, antidrug campaigns, and the environment.

• Narrow, extremist views of either the left or the right will slowly lose their popularity. Moderate Republicans and conservative Democrats will lead their respective parties. This trend has been reinforced by the experience of recent presidential elections in which third-party candidates siphoned votes from less-extreme main-party candidates. Many voters, feeling that a vote for an alternative candidate is tantamount to a vote for the major opposition, are likely to accept less doctrinal purity in their party's representatives.

Implications: The highly polarized political environment that has increasingly plagued the United States in the 1980s and 1990s will slowly moderate as results-oriented generations X and dot-com begin to dominate the national dialogue.

Current accounting reforms are just the leading edge of a wave of stockholder protection laws and regulations that can be expected within the next five years.

The demand for greater accountability and transparency will be crucial, not only in the U.S. business community, but also for countries that wish to attract international investors.

9 Young people place increasing importance on economic success, which they have come to expect.

• Throughout the 1990s—effectively, their entire adult lives—generations X and dot-com knew only good economic times, and the current economic downturn seems to them a confusing aberration, rather than a predictable part of the business cycle. Most expect to see hardship on a national level, but they both want and expect prosperity for themselves.

• Growing numbers of people now become entrepreneurs. Generations X and dot-com are the most entrepreneurial generations in history.

• In the United States especially, most young people have high aspirations, but many lack the means to achieve them. Only one in three high-school graduates goes on to receive a college degree. Many of the rest wish to go, but cannot afford the high cost of further schooling.

• Without higher education, expectations may never be met: The real income of high-school graduates has declined steadily for more than 50 years. In addition, more young people report no earnings—up from 7% of all 20- to 24-year-old men in 1973 to a relatively constant 12% since 1984.

Implications: This will prove to be a global trend, as members of generations X and dot-com tend to share values throughout the world. Gen X and dot-com entrepreneurs are largely responsible for the current economic growth in China, where they are becoming a major force in the Communist party. In India, the younger generations dress and think like their American counterparts, not their parents.

If the current economic downturn becomes unexpectedly deep or prolonged, members of these generations will find it difficult to cope. They will need guidance from their boomer parents and World War II–era grandparents, who have seen hard times before. This could trigger a move to rehire older workers cut during the downsizing of the 1990s, to restore or acquire the kind of institutional memory that helps companies meet challenges not encountered regularly. That in turn could create a generational conflict, as retirement-age candidates take jobs that younger workers feel rightfully belong to them.

If younger-generation workers find their ambitions thwarted, they will create growing pressure for economic reform and deregulation. If reforms do not come fast enough in the developing world, disappointed expectations will raise the number of young people who emigrate to the developed lands.

Disappointment also will drive underemployed young men in the developing world into fringe political and religious movements. This could cause a new wave of terrorism and instability in the years after 2005 or so.

10 Tourism, vacationing, and travel (especially international) will continue to grow in the next decade, as they did throughout the 1990s.

• People today have more disposable income, especially in two-earner families.

• The number of Americans traveling to foreign countries (excluding Canada and Mexico) increased at 5% per year from 1981 through 1996. Once current worries over the threat of terrorism recede, that growth will resume and will continue for the foreseeable future.

• In the United States, domestic tourism rebounded strongly in the first year after the terrorist attack of September 11, 2001. Travel to gambling centers such as Las Vegas and Atlantic City was first to revive.

• Through at least 2004, depressed

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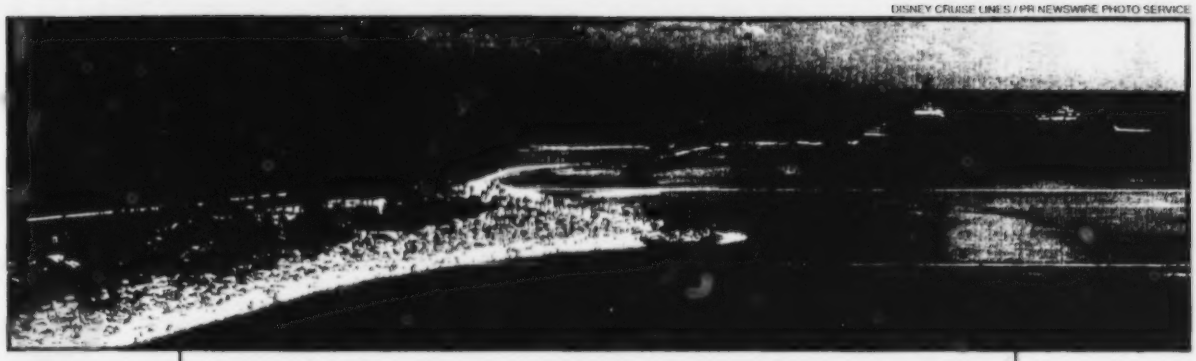

Cruising to a private paradise, with lush greenery and white-sand beaches, "imagineered" by Disney Cruise Line to complement the shipboard experience.

Trend 10

Asian currencies will make it cheaper to visit the Far East.

• Tourism will benefit as Internet "virtual" tours replace printed brochures in promoting vacation destinations. Web sites cover not only popular attractions, but also provide current, detailed information on accommodations, climate, culture, currency, language, and immunization and passport requirements.

• Multiple, shorter vacations spread throughout the year will continue to replace the traditional two-week vacation.

• More retirees will travel off-season, spreading travel evenly throughout the year and eliminating the cyclical peaks and valleys typical of the industry.

Implications: The hospitality industry will grow at a rate of at least 5% per year for the foreseeable future, and perhaps a bit more. Tourism offers growing opportunities for out-of-the-way destinations that have not yet cashed in on the boom.

Cruise ships such as the giant, 2,600-passenger *Queen Mary 2* (set to launch in January 2004), will continue to grow larger.

11 Consumerism is still growing rapidly.

• A networked society facilitates a consumerist society. Shoppers increasingly have access to information about pricing, services, delivery time, and customer reviews on the Internet. Marketers, of course, can also check the competition's offerings. This may gradually halt the decline of prices and shift competition increasingly to improvements in service and salesmanship.

• Consumer advocacy agencies and organizations will continue to proliferate, promoting better information—unit pricing, improved content labels, warning notices, nutrition data, and the like—on packaging, television, and the Internet.

• Discount stores such as Home Depot and Wal-Mart, factory outlets, and food clubs will continue to grow in the United States, a trend that has just begun to spread to Europe and Japan.

Implications: In the next 20 years, Europe and Japan can expect to undergo the same revolution in marketing that has replaced America's neighborhood stores with cost-cutting warehouse operations and "category killers." This will inspire social unrest in countries where farmers and owners of small shops have strong cultural or political positions.

This trend also will spread to China, though it will run several years behind developments in Europe and Japan.

As prices fall to commodity levels and online stores can list virtually every product and brand in their industry without significant overhead, service is the only field left in which marketers on and off the Net can compete effectively.

Branded items with good reputations are even more important for developing repeat business.

12 The physical-culture and personal-health movements will remain strong, but far from universal.

• Emphasis on preventive medicine is growing. In recent years, most insurance carriers in the United States have expanded coverage or reduced premiums for policyholders with healthy lifestyles. By 2003, 90% of insurers will offer such benefits.

• A 2001 Harris Poll showed that about one-third of Americans ate at fast-food restaurants less often than a year before, citing health reasons.

• In a 2001 poll, 75% of Canadians reported having changed their diets in the previous year in order to improve or maintain their health. Some 20% had reduced fat consumption, 18% had cut back on sweets, and 11% had trimmed red meat.

• However, this trend has not yet had a similar impact on Europe, and people in many countries of the developing world still worry more about eating enough than eating well.

• U.S. consumers are purchasing less distilled liquor. Exception: Younger generations have revived the once passé taste for mixed drinks, but have proved to be uncommonly responsible drinkers. Most limit themselves to one or two

drinks with a meal, and designated drivers are standard practice.

• Smoking also is in general decline in the United States. Only 21% of Americans smoked cigarettes as of January 2000, down from 30% in 1983. Financial disincentives such as higher taxes on cigarettes should produce further declines of 10%.

Implications: Better health in later life will make us still more conscious of our appearance and physical condition. Thus, health clubs will continue to boom, and some will specialize in the needs of older fitness buffs. Diet, fitness, stress control, and wellness programs will prosper.

Like tobacco companies, producers of snack foods, liquor, and other medically dubious products will increasingly target markets in developing countries, where this trend has yet to be felt.

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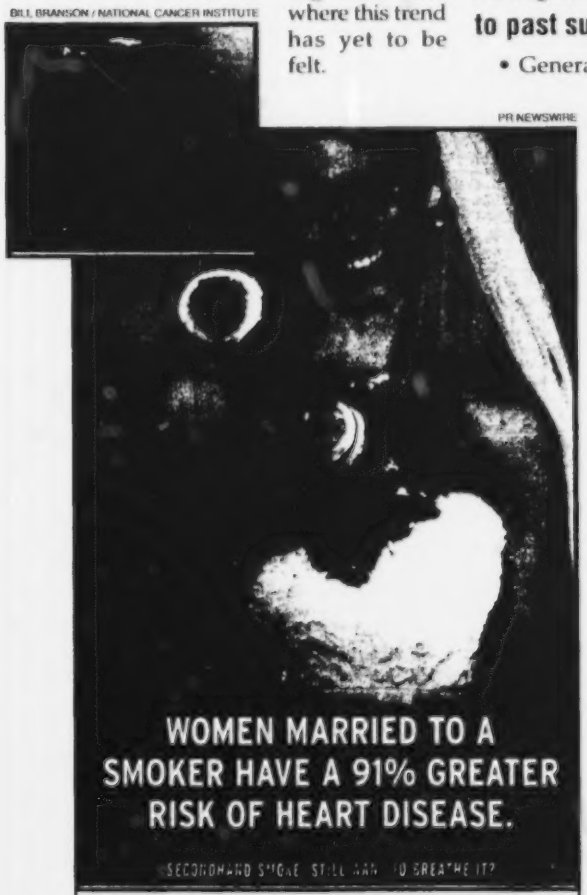

Antitobacco ad campaign educates women on the risks of secondhand smoke.

Trend 12

The cost of health care for U.S. baby boomers and their children could be much lower in later life than is now believed. However, Asia faces an epidemic of cancer, heart disease, emphysema, and other chronic and fatal illnesses related to health habits.

As the nutrition and wellness movements spread, they will further improve the health of the elderly. The market for cosmetic surgery and Botox treatments—which may be more about *appearing* than *being* healthy—will continue to grow rapidly.

13 The women's equality movement is beginning to lose its significance, thanks largely to past successes.

• Generations X and dot-com are virtually gender-blind in the workplace, compared with older generations.

• Fully 57% of American college students are women. Among minorities, the proportion is even higher: 60% of Hispanic and two-thirds of African-American college students are women.

• Women's increasing entrepreneurialism will allow the formation of entrenched "old girl" networks comparable to the men's relationships that once dominated business.

• An infrastructure is evolving that allows women to make more decisions and to exercise political power, especially where both spouses work. One indication of growing dependence on the wife: Life insurance companies are selling more policies to women than to men.

• More women are entering the professions, politics, and the judiciary. They also are gradually finding roles as combat soldiers.

Implications: Whatever careers remain relatively closed to women will open wide in the years ahead.

Demand for child care and other family-oriented services will continue to grow, particularly in the United States, where national services have yet to develop. Over the next 20 years, this may force American companies to compete on a more even footing with their counterparts in Europe, whose taxes pay for national day-care programs and other social services the United States lacks.

In the long run, the need to work with female executives from developed countries will begin to erode the restrictions placed on women's careers in Asia and other developing regions.

14 Family structures are becoming more diverse.

• In periods of economic difficulty, children and grandchildren move back in with parents and grandparents to save on living expenses. In the United States, one-third of Gen X'ers have returned home at some point in their early lives.

• Growing numbers of grandparents are raising their grandchildren, because drugs and AIDS have left the middle generation either unable or unavailable to care for their children. This trend is strongest in Africa, where AIDS has orphaned more than 12 million children.

• Among the poor, grandparents also provide live-in day care for the children of single mothers trying to gain an education or build a career.

• Vermont's first-in-the-country law granting partners in same-sex relationships most of the legal rights formerly reserved to married couples took effect in 2000. As of mid-2002, California legislators were considering a civil-union law. Germany, the Netherlands, and parts of Canada all have such laws, and similar proposals have wide support in Britain.

• Yet the nuclear family also is re-

bounding, as baby boom and Gen X parents focus on their children and grandparents retain more independence and mobility.

Implications: Tax and welfare policies need adjustment to cope with families in which heads of households are retired or unable to work.

Policies also need to be adjusted for those who receive Social Security and are still forced to work to support an extended family.

In the United States, the debates over homosexuality and the "decline of the family"—temporarily displaced from attention by the anti-terrorist campaign—will regain their status as hot-button issues for at least two more election cycles.

Concern for other "family values" will return as well, but this time the debate will be shaped by the real-world needs of diverse families rather than the agendas of religious conservatives.

Energy Trends

15 Despite all the calls to develop alternative sources of energy, oil consumption is still rising rapidly.

• The world used only 57 million barrels of oil per day in 1973, when the first major price shock hit. By 1999, it was using more than 73 million barrels daily. Consumption is expected to reach 110 million barrels daily by 2020.

• However, oil's share of world energy consumption has begun to decline: It is expected to drop from 40% in 1999 to about 37% in 2020.

• The United States consumed 19.7 million barrels of oil daily in 2000, of which 10.4 million barrels came from net imports—up from 6.3 million barrels in net imports in 1973. Domestic oil production is expected to disappear by about 2055, even if reserves are tapped in the Arctic National Wildlife Refuge.

• OPEC will supply most of the world's oil, with Russia the second-largest producer. According to the U.S. Department of Energy, OPEC oil production will grow by some 24 million barrels of oil per day by 2020, to about 55 million barrels per day. This is nearly two-thirds of the world's total projected increase in production.

• There is reason to wonder whether this oil will be available to the United States, however. Saudi Arabia is likely to be taken over by a fundamentalist Islamic government similar to that of Iran; if, upon the death of King Fahd, Osama bin Laden or one of his deputies seizes power, the new regime is unlikely to provide oil to the United States.

Implications: Low oil prices in the mid- to late-1990s slowed development of fields outside the Middle East. It costs $10,000 to increase oil production by one barrel per day in most of the world, but only $5,500 for the OPEC lands. It would take a prolonged surge in oil prices, to levels like those seen in 2000, to provide an incentive to develop new fields, such as the Arctic National Wildlife Refuge. (Such sites could benefit from new drilling techniques that make it possible to extract oil with less damage to the environment.)

That surge in prices could occur within the next five years as a result of political changes in Saudi Arabia. If it does not materialize soon after the death of King Fahd, no major rise can be expected in the price of oil in the foreseeable future, keeping consumption steadily high.

16 Contrary to popular belief, the world is not about to run out of oil.

• As a result of intensive exploration, the world's proven oil reserves climbed from about 660 billion barrels in 1980 to more than 1 trillion barrels in 1990. Despite consumption, they have hovered over 1 trillion barrels ever since.

• OPEC officials claim that the 11 member countries can provide for the world's energy needs for roughly the next 80 years. OPEC currently supplies about 40% of the world's oil and holds 60% of the oil available internationally. It will continue to supply most of the oil used by the developed world. According to the U.S. Department of Energy, OPEC oil production will nearly double to about 57 million barrels of oil per day by 2020.

• Oil production outside the OPEC nations has not yet peaked. Existing wells and refineries are operating below capacity, and at least a few non-OPEC lands have enough proven reserves to justify building more. By 2010, China, Russia, and Kazakhstan will be major suppliers—if political uncertainties in Russia and Kazakhstan do not block investment by Western oil companies.

Implications: If the price of oil rises significantly beyond current levels, new methods of recovering oil from old wells will become cost effective. Technologies already developed could add nearly 50% to the world's recoverable oil supply.

However, proposed construction of ethanol plants to supplement oil supplies would be a wasted effort. Until oil prices rise significantly more than they are likely to in the near future, ethanol simply is not cost effective. This has been amply demonstrated by the history of Brazil's ambitious program to replace oil with ethanol, which has proved an abject failure.

17 Oil prices are likely to remain generally around $22 to $26 per barrel for at least the next five years.

• OPEC's current aim is to hold the price of oil at $25 per barrel, but doing so requires a unity of purpose that member countries have never been able to sustain for very long.

• The vulnerability of oil prices was reinforced in the months after September 11, when they fell to just $19.88.

• New oil supplies coming on line in the former Soviet Union, China, and other parts of the world will make it even more difficult to sustain prices at artificially high levels.

• The 20 most-industrialized countries all have at least three-month supplies of oil in tankers and underground storage. Most have another three months' worth in "strate-

gic reserves." In times of high oil prices, customer nations can afford to stop buying until the costs come down.

Implications: In response to high (by American standards) gas prices, the U.S. government will probably boost domestic oil production and refining to increase the reserve of gasoline and heating oil. This stockpile would be ready for immediate use in case of future price hikes, as in the winter 2000 release from strategic reserves. This will make it easier to negotiate with OPEC.

One upward pressure on the price of American gasoline: The Environmental Protection Agency's "Tier 2" regulations, which aim to dramatically reduce emissions of particulates and nitrogen oxides, are scheduled to take effect between 2006 and 2009. Production of super-low-sulfur fuels mandated under the plan is expected to add about 4¢ per gallon to the cost of gas and 6¢ per gallon to the price of diesel fuel.

18 Growing competition from other energy sources also will help to limit the price of oil.

• Solar, geothermal, wind, and wave energy will ease power problems where these resources are most readily available, though they will supply only a very small fraction of the world's energy in the foreseeable future. Worldwide wind-power generating capacity grew by 6,500 megawatts in 2001 alone, the fastest rate of growth yet recorded and 50% more than the previous year. Photovoltaic solar energy production has been growing at a steady 25% per year since 1980.

• Natural gas burns cleanly, and there is enough of it available to supply the world's total energy demand for the next 200 years. Consumption of natural gas is growing by 3.3% annually, compared with 1.8% for oil.

• Nuclear plants will supply 16% of the energy in Russia and eastern Europe by 2010.

GREEN MOUNTAIN ENERGY COMPANY / PR NEWSWIRE PHOTO SERVICE

Wind power and other alternatives will compete with oil, keeping fuel prices down.

Trend 18

Wind Energy Improvements

	1981	2000
Rated Capacity	25kW	1,650 kW
Rotor diameter	10 meters	71 meters
Cost	$2,600 per kW	$790 per kW
Output	45,000 kWh/year	5.6 million kWh/year

Advanced design and controls have enabled wind energy capacity to soar and costs to decline over the past two decades.

Source: American Wind Energy Association, www.awea.org.

• According to the Energy Information Agency at the U.S. Department of Energy, shifting 20% of America's energy supply to renewable resources by 2020 would have almost no impact on the total cost of power. At present, less than 5% of the energy used in the United States comes from renewable resources.

• A new technique called muon-catalyzed fusion reportedly could produce commercially useful quantities of energy by 2020.

Implications: Though oil will remain the world's most important energy resource for years to come, two or three decades forward it should be less of a choke point in the global economy. Declining reliance on oil could help to reduce air and water pollution, at least in the developed world. By 2060, a costly but pollution-free hydrogen economy may at last become practical.

Environmental Trends

19 People around the world are becoming increasingly sensitive to environmental issues such as air pollution, as the consequences of neglect, indifference, and ignorance become ever more apparent.

• Soot and other particulates are coming under greater scrutiny as threats more dangerous to human health than sulfur dioxide and other gaseous pollutants. In the United States alone, medical researchers estimate that some 64,000 people each year die from cardiopulmonary disease as a result of breathing particulates. In sub-Saharan Africa, the toll is between 300,000 and 500,000 deaths per year, and in Asia, between 500,000 and 1 million people annually die of particulate exposure.

• In all, the World Health Organization estimates that 3 million people die each year from the effects of air pollution, about 5% of the total deaths annually.

• Governments are taking more-active measures to protect the envi-

LIZ GILBERT, DAVID AND LUCILE PACKARD FOUNDATION / WWW.IHUCCP.ORG/AMIC

Smoggy urban thoroughfare in Nigeria. Pollution may be responsible for as many as half a million deaths a year in sub-Saharan Africa.

Trend 19

ronment. For instance, after years of ineffective gestures, Costa Rica has incorporated about 25% of its land into protected areas, such as national parks.

• An estimated 80% of logging in the Amazon basin is illegal. In 1999, Brazil raised the maximum fine for illegal logging to more than $27 million and changed legal procedures so that the fines can actually be imposed.

• In India, government policies consistently rate industrial development more important than the environment. Yet, in an effort to reduce air pollution, India's Supreme Court has limited sales of new cars in New Delhi to 18,000 per year, less than one-fourth of the average previously sold.

• In the United States, despite an administration generally considered unfriendly toward environmental causes, the EPA's mandate to cut tailpipe emissions by 70% is still on track, and California has refused to ease or delay its even-tighter restrictions on auto emissions.

Implications: Environmental policies will provoke a political backlash wherever they conflict with entrenched interests, as they have long done in the American West. However, the cost of not protecting the environment is too obvious to be ignored. Throughout most of the world, polluters and private beneficiaries of public assets will increasingly confront restrictive regulations designed to serve the interests of the community at large.

20 Water shortages will be a continuing problem for much of the world.

• One-third of the population of Africa and most of the major cities in the developing world will face water shortages, according to the United Nations.

• The northern half of China, home to perhaps half a billion people, already is short of water. The water table under Beijing has fallen nearly 200 feet since 1965. It declined by eight feet in 1999 alone.

• Water usage is causing other problems as well. For example, irrigation water evaporates, leaving minerals in the soil. By 2020, 30% of the world's arable land will be salty; by 2050, 50%. Salinization already is cutting crop yields in India, Pakistan, Egypt, Mexico, Australia, and parts of the United States.

• Pollution further reduces the supply of safe drinking water. The European Parliament estimates that 70% of the Continent's drinking water contains dangerous concentrations of nitrate pollution. In the United States, there is growing concern that pollutants such as perchlorate, the gasoline additive MTBE, and even the chlorine used to kill waterborne pathogens may represent significant health concerns.

• In India, an estimated 300 million people lack access to safe drinking water, due to widespread pollution of rivers and groundwater.

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Water quality is a growing problem even in developed lands.

Trend 20

• Water quality is a growing problem even in the developed lands. In the United States, cities such as Atlanta, where the delivery system is a century old and poorly maintained, suffer frequent water-main breaks, which suck dirt, debris, bacteria, and pollutants into the water supply. There are an estimated 237,600 such breaks each year in the United States.

• Many ecologists believe that global warming will make drought much more frequent—even the norm—west of the Mississippi.

• Contaminated water is implicated in 80% of the world's health problems. An estimated 40,000 people around the world die each day of diseases directly caused by contaminated water—that's more than 14 million per year.

Implications: By 2040, at least 3.5 billion people will run short of water, almost 10 times as many as in

1995. By 2050, fully two-thirds of the world's population could be living in regions with chronic, widespread shortages of water.

Water wars, predicted for more than a decade, are an imminent threat in places like Kashmir: Much of Pakistan's supply comes from areas of Kashmir now controlled by India. Such problems as periodic famine and desertification also can be expected to grow more frequent and severe in coming decades.

Impurities in water will become an even greater problem as the population ages and becomes more susceptible to infectious diseases.

In the United States, repair of decayed water systems is likely to be a major priority for older cities such as New York, Boston, and Atlanta.

21 Recycling has delayed the "garbage glut" that threatened to overflow the world's landfills, but the threat has not passed simply because it has not yet arrived.

- Americans now produce about 4.4 pounds of trash per person per day, twice as much as they threw away a generation ago.
- In June 2002, New York City abandoned its 14-year-old recycling effort for glass, plastic, and beverage cartons, which city authorities held was not cost effective. This cut recycling from about 21% of waste to an estimated 10% and sent an extra 1,200 tons of litter to landfills each day. By contrast, Seattle recycles about half of its solid waste.
- Seventy percent of U.S. landfills will be full by 2025, according to the EPA.
- In London and the surrounding region, landfills will run out of room by 2012. For household trash, landfill space will be exhausted by 2007.
- In some other regions, simply collecting the trash is a major problem. Brazil produces an estimated 240,000 tons of garbage daily, but only 70% reaches landfills. The rest accumulates in city streets, where it helps to spread disease.

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A boy picks through a garbage dump outside Manila. In some places, garbage never even makes it to landfills, accumulating in streets.

Trend 21

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Florida manatee and friends. The chief cause of species loss is destruction of natural habitats.

Trend 23

• Recycling and waste-to-energy plants are a viable alternative to simply dumping garbage. The United States has more than 2,200 landfills. Europe, where recycling and energy conversion are much more common, gets by with 175.

Implications: Expect a wave of new regulations, recycling, waste-to-energy projects, and waste management programs in an effort to stem the tide of trash. It will, of course, begin in California.

Existing regulations will be tightened and disposal prices raised in Pennsylvania, South Carolina, Louisiana, and other places that accept much of the trash from major garbage producers such as New York.

22 Industrial development trumps environmental concerns in many parts of the world.

• In 1999, *Samachar*, an Internet newspaper from India, asked its readers what significant problems face their country. Despite rampant deforestation, widespread air and water pollution, loss of biodiversity, and many other such problems, environmental degradation came in next to last among 10 issues, cited by only 1% of the respondents.

• "A deep and abiding distrust of environmental imperatives has been cultivated in large segments of South Africa's population," due to years of apartheid-era restrictions that were often justified as environmental measures, according to a study of environmental business opportunities by Industry Canada.

• Some 70% of the energy used in China comes from coal-burning power plants, few of which are equipped with pollution controls. Scientists estimate that by 2025 China will emit more carbon dioxide and sulfur dioxide than the United States, Japan, and Canada combined.

• Acid rain like that afflicting the United States and Canada will appear wherever designers of new power plants and factories neglect emission controls. A 1995 study of 77 Chinese cities found that 81% suffered from acid rain. In India, an area the size of the United States is covered by a haze of sulfates and other chemicals associated with acid rain. Look for this problem to appear in most other industrializing countries as well.

Implications: Broad regions of the planet will be subject to pollution, deforestation, and other environmental ills in the coming decade.

Diseases related to air and water pollution will spread dramatically in the decades ahead. Already, chronic obstructive pulmonary disease is five times more common in China than in the United States.

This is just a taste of future problems, and perhaps not the most troublesome. Even the U.S. government now admits that global warming is a result of human activities that produce greenhouse gases. It now seems that China and India soon will produce even more of them than the major industrialized nations. Helping the developing lands to raise their standards of living without causing wholesale pollution will require much more aid and diplomacy than the developed world has ever been willing to devote to this cause.

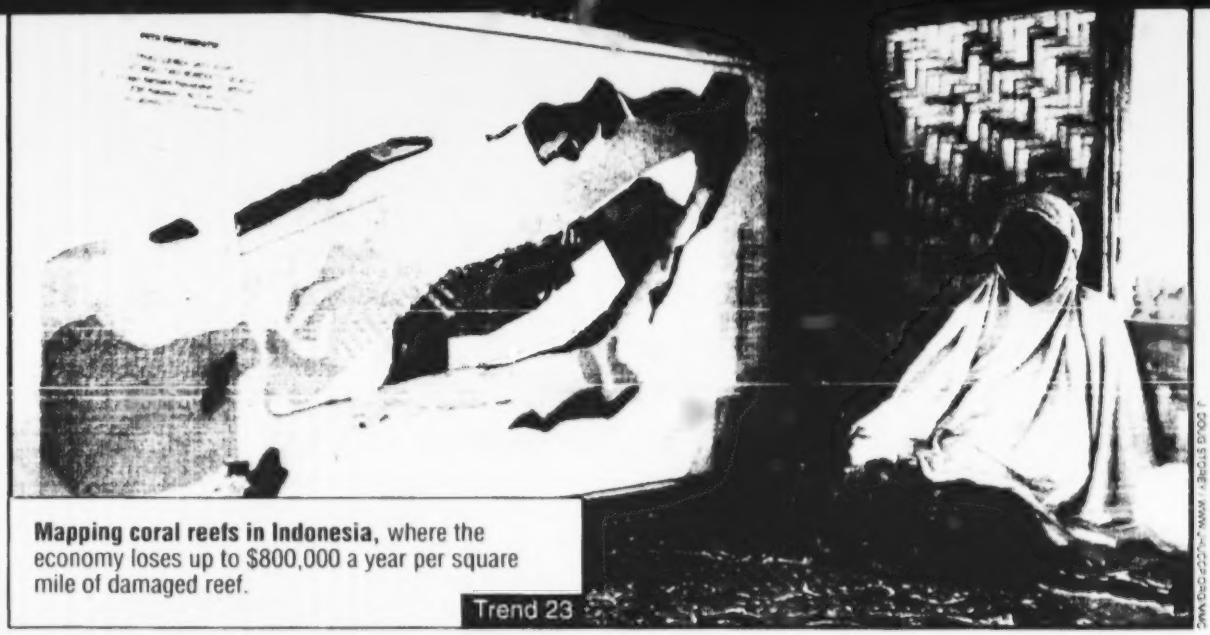
23 Though species extinction may not be so rapid as once believed, loss of biodiversity will be a growing worry for decades to come.

• An estimated 50,000 species disappear each year, up to 1,000 times the natural rate of extinction, according to the United Nations Environmental Program.

• Eleven percent of birds, 25% of mammals, and 20% to 30% of all plants are estimated to be nearing extinction.

• Throughout the world, amphibian populations are in decline, for reasons that, after more than a decade of intensive research, remain poorly understood.

• Coral reefs throughout the



Mapping coral reefs in Indonesia, where the economy loses up to $800,000 a year per square mile of damaged reef.

Trend 23

world are dying rapidly, again for reasons that are not entirely clear.

• The chief cause for species loss, according to University of Colorado scientists, is the destruction of natural habitats by logging, agriculture, and urbanization.

Implications: Species loss has a powerful negative impact on human well-being. Half of all drugs used in medicine are derived from natural sources, including 55 of the top 100 drugs prescribed in the United States. So far, less than 0.5% of flowering plants have been assayed for potential pharmaceuticals.

In Indonesia, home to one-eighth of the world's coral reefs, more than 70% of the reefs are dead or dying. The Indonesian economy loses an estimated $500,000–$800,000 annually per square mile of dead or damaged reef.

Researchers from the United Kingdom's National Environmental Research Council Centre for Population Biology report that diverse ecosystems absorb more carbon dioxide than those with fewer species. Loss of biodiversity thus is a potential cause of global warming.

24 Continuing urbanization will aggravate most environmental and social problems.

• In 2000, some 2.8 billion people were urbanites, about 47% of the total world population. By 2030, 60% of the global population will live in cities.

• Between 2000 and 2030, the global population will grow by an estimated 2.2 billion. Of this, 2.1 billion people will be added to the world's cities.

• In the past, urbanization has proceeded fastest in the countries now industrialized. In the more developed countries, 76% of the population lives in cities; in the developing lands, only 40% are urbanites. Today, cities are growing fastest in the developing world.

• The big are getting bigger. In 1950, there were just eight megacities, with populations over 5 million, in the world. By 2015, there will be 59 megacities, 48 of them in less-developed countries. Of these, 23 will have populations over 10 million, all but four in the developing lands.

• Natural increase now accounts for more than half of population increase in the cities; at most, little more than one-third of urban growth results from migration.

• Up to 1 billion city dwellers lack adequate shelter, clean water, toilets, or electricity. The United Nations estimates that these problems cause 10 million needless deaths annually.

• According to the Worldwatch Institute, fuels burned in cities account for 75% of global carbon emissions from human activity.

• NASA scientists point out that urbanization also tends to put buildings and blacktop on the most fertile land, eliminating significant quantities of carbon-absorbing plants.

• Urbanization also deprives surrounding areas of water: Instead of sinking into the ground, rain is collected, piped to the city, used, treated as gray water, and then discarded into the ocean. In some regions, such as near Atlanta, water levels in local aquifers are declining rapidly because the water that once replenished them now is lost.

• The United States is the one major counterexample to this trend. This automobile-reliant society built one of the best highway systems in the world and has relatively little mass transit, so more Americans live in the suburbs than in the cities.

Implications: Cities' contribution to global warming can only increase in the years ahead.

As the world's supply of potable water declines, people are concentrating in those areas where it is hardest to obtain and is used least efficiently.

Deaths due to shortages of shelter, water, and sanitation can only grow. Epidemics will become still more common as overcrowding spreads HIV and other communicable diseases more rapidly.

Since the growth is now due more to natural increase than to migration, programs designed to encourage rural populations to remain in the countryside may be misplaced. Education and family planning seem more likely to rein in the growth of cities.

Technology Trends

25 Technology increasingly dominates both the economy and society.

• In all fields, the previous state of the art is being replaced by new high-tech developments at an ever faster rate.

• Computers are fast becoming part of our environment, rather than just tools we use for specific tasks. With wireless modems, portable computers give us access to networked data wherever we go.

• Mundane commercial and service jobs, environmentally dangerous jobs, and assembly and repair of inaccessible equipment such as undersea cables and space-station components in orbit increasingly will be done by robots. Personal robots will appear in the home by 2010.

• Global sales of packaged software are growing at a rate of more than 15% per year.

• Wireless links such as satellite-based telephone systems and Internet connections will simplify relocation of personnel, minimize delays in completing new installations, and let terminals travel with the user instead of forcing the user to seek out the terminal.

• By 2005, artificial intelligence, data mining, and virtual reality will help most companies and government agencies to assimilate data and solve problems beyond the range of today's computers. AI's uses include robotics, machine vision, voice recognition, speech synthesis, electronic data processing, health and human services, administration, and airline pilot assistance.

• By 2005, expert systems will permeate manufacturing, energy prospecting, automotive diagnostics, medicine, insurance underwriting, and law enforcement.

• Superconductors operating at economically viable temperatures will be in commercial use soon after 2015. Products eventually will include supercomputers the size of a three-pound coffee can, electric motors 75% smaller and lighter than those in use today, practical hydrogen-fusion power plants, electrical storage facilities with no heat loss, and noninvasive analyzers that can chart the interaction of individual brain cells.

• The engineering, technology, and health industries all will grow rapidly, and many new biotechnology jobs will open up as new developments continue to appear.

Implications: New technologies often require a higher level of education and training to use them effectively. They also provide dozens of new opportunities to create businesses and jobs.

Automation will continue to cut the cost of many services and products, making it possible to reduce prices while still improving profits. This will be critical to business survival as the Internet pushes the price of most products to the commodity level.

New technology also will make it easier for industry to minimize and capture its effluent, a crucial ability in the environmentally conscious future.

26 Research and development play a growing role in the economy.

• R&D spending is growing most quickly in the fields of information technology, electronics, biotechnol-

FUJITSU

Fujitsu's new robot for the home, MARON-1, can be remotely controlled by mobile phone to operate home appliances. Equipped with a camera, the home-bot also does sentry duty.

Trend 25

BILL BRANSON / NATIONAL CANCER INSTITUTE

Researchers examine computer-generated molecular model. Spending on research and development in many technical fields is growing.

Trend 26

ogy, aerospace, pharmaceuticals, and chemistry.

• Throughout the 1990s, R&D outlays rose steadily, ranging between 2.4% and 2.7% of U.S. GDP, and future increases will pace the growth of GDP.

• R&D outlays in Japan have risen almost continuously, to nearly 3% of GDP. In Britain, they have declined as steadily, to less than 1.9% of GDP. In Russia, they fell from about 2% of GDP in 1990 to under 1% in 1997, the most recent year for which figures are available.

• Jobs created by high-tech exports are more than replacing those lost to competition under the North American Free Trade Agreement (NAFTA) and similar agreements, providing a net gain in employment in the United States. Some 2.9 million American jobs are now supported by exports to NAFTA countries, more than double the number of jobs believed to have been lost from low-tech manufacturing industries. Canada and Mexico report proportionally greater gains.

Implications: The demand for scientists, engineers, and technicians will continue to grow, particularly in fields where research promises an immediate business payoff.

However, by inhibiting stem-cell research, the United States has made itself a less attractive place for cutting-edge biomedical scientists. The United Kingdom is capitalizing on this to become the world's leader in stem-cell research. In the process, it is reversing the long-standing "brain drain" that deprived it of top scientists.

Low-wage countries such as China will continue to take low-wage jobs from advanced industrialized countries such as the United States, but those jobs will be replaced by higher-paid jobs in technology and service industries.

Countries like India, China, and Russia will continue to suffer a substantial brain drain as those with high-tech skills emigrate to the United States and other high-demand, high-wage destinations. This will adversely affect the economies of the "donor" countries.

27 Advances in transportation technology will speed travel and shipping, both on land and in the air.

• By 2010, New York, Tokyo, and Frankfurt will emerge as transfer points for passengers of high-speed, large-capacity supersonic planes.

• Airline crashes will decline and will involve fewer fatalities, thanks to such technical advances as safer seat design and flash-resistant fuels.

AUDIOVISUAL LIBRARY EUROPEAN COMMISSION

Air transport takes off at Zaventem-Brussels Airport, Belgium. Advances in technology will reduce airline crashes and fatalities.

Trend 27

• Following European practice, the U.S. airline industry will begin to replace the spokes of its existing hub-and-spokes system with high-speed trains for journeys of 100 to 150 miles.

• There are more than 500 million cars in the world, and the number is growing quickly.

• The average life of a car in the United States is approaching 22 years.

• Advances in automobile technology such as road-condition sensors, continuously variable transmissions, automated traffic management systems, night-vision systems, and smart seats that tailor airbag inflation to the passenger's weight will all be in common use by 2010.

• The first commercial hybrid gas-electric cars are available already. New models will begin to win market share from traditional gas guzzlers between 2005 and 2010.

• To reduce the number and severity of traffic accidents, trucks on the most heavily used highways will be exiled to car-free lanes, and the separation will be enforced.

Implications: One of the fastest-growing transport industries is trucking, in part because computers encourage "just-in-time" inventory management. Deliveries for Internet-based companies are an expanding market for shipping. This field will grow more efficient as GPS-based truck tracking and other new technologies spread through the industry.

More-efficient vehicles, especially with hybrid power trains, should begin to reduce the demand for oil by 2008, easing one of the few remaining sources of inflation.

By 2010, "smart car" technologies will begin to reduce deaths due to auto accidents in Europe and, slightly later, the United States.

Cities increasingly will struggle to reduce auto congestion, either by limiting the use of private automobiles—as in Munich, Vienna, and Mexico City—or by encouraging the development and use of mass transit, as in Copenhagen and Curitiba, Brazil.

Technology may offer other alternatives. One proposal is "dualmode transportation," in which private cars would be used normally on short hauls but would run on automated guideways for long-distance travel.

28 The pace of technological change accelerates with each new generation of discoveries and applications.

• The design and marketing cycle—idea, invention, innovation, imitation—is shrinking steadily. Thus, products must capture their market quickly, before the competition can copy them. As late as the 1940s, the product cycle stretched to 30 or 40 years. Today, it seldom lasts 30 or 40 weeks.

• Computer-aided design in the automobile and other industries shortens the lag time between idea and finished design.

• Eighty percent of the scientists, engineers, and doctors who ever lived are alive today—and exchanging ideas in real time on the Internet.

• All the technical knowledge we work with today will represent only 1% of the knowledge that will be available in 2050.

Implications: Industries will face much tighter competition based on

PACIFIC NORTHWEST LABS

Projection of lightweight "clean car" model floats overhead at Pacific Northwest Laboratories. Computer-aided design will accelerate development from idea to design.

Trend 28

new technologies. Those who adopt state-of-the-art methods first will prosper. Those who ignore them eventually will fail.

29 Important medical advances will continue to appear almost daily.

• Medical knowledge is doubling every eight years.

• Half of what students learn in their freshman year about the cutting edge of science and technology is obsolete, revised, or taken for granted by their senior year.

• The Human Genome Project has already begun to yield promising new treatments for genetic disease. Early results include possible cures for hemophilia, cystic fibrosis, familial hypercholesterolemia, a number of cancers, and AIDS. Eventually, some 4,000 hereditary disorders may be prevented or cured through genetic intervention. As many as 300 such treatments are expected to enter clinical testing by 2005.

• The discovery that human chorionic gonadotropin (hCG) appears in all cancer cells tested thus far, and (among adults) only in cancer cells, seems to promise the development of a generalized "cure for cancer." If early tests pan out, by 2010 or sooner, tumors could be treated routinely and successfully with simple injections in the family doctor's office.

• Our growing knowledge of biochemistry, aided by advanced computer modeling, has made it possible to design drugs to fit specific receptors in the cell. Drugs created through this technology often are much more effective than natural derivatives or the products of "synthesize, scan, and hope" methods, and they are much less likely to cause adverse side effects.

• By 2005, artificial blood will begin to stretch the supply of blood, which is expected to fall short of demand by 4 million units per year for the next 30 years.

• Memory-enhancing drugs should reach clinical use by 2010.

• New computer-based diagnostic tools are providing unprecedented images of soft and hard tissues inside the body, eliminating much exploratory surgery.

• "Bloodless surgery" using advanced lasers is reducing patient trauma, continuing to shorten hospital stays, and helping lower medical costs.

• "Magic bullet" drug-delivery systems will make it possible to direct enormous doses of medication exactly where they are needed, sparing the rest of the body from possible side effects. This will improve therapeutic results in cancers and many other conditions that require the use of powerful drugs. Laparoscopic and endoscopic surgery are providing similar benefits.

• Brain-cell and nerve-tissue transplants to aid victims of retardation, head trauma, and other neurological disorders will enter clinical use by 2005. So will heart repairs using muscles from other parts of the body. Transplanted animal organs will find their way into common use. Laboratory-grown bone, muscle, and blood cells also will be used in transplants.

• Other transplanted tissues will come from cloning and related technologies used to grow stem cells. Radical new treatments for diabetes, Parkinson's disease, perhaps Alzheimer's, and many other refractory disorders can be expected to arrive within the next five to 10 years. Whether American physicians will be allowed to use them is still being debated. Forecasting International believes that cloning and related methods will be accepted for the treatment of disease.

• Surgeons working via the Internet will routinely operate on patients in remote areas, using robot manipulators.

• In the next 10 years, we expect to see more and better bionic limbs, hearts, and other organs; drugs that prevent disease rather than merely treating symptoms; and body monitors that warn of impending trouble. These all will reduce hospital stays.

• "Nutraceuticals" and "foodaceuticals"—nutritional supplements and foods with drugs either added or genetically engineered into them—will be one of the hottest new areas in the health-care industry for the next 20 years.

• By 2025, the first nanotechnology-based medical therapies should reach clinical use. Microscopic machines will monitor our internal processes, remove cholesterol plaque from artery walls, and destroy cancer cells before they have a chance to form a tumor.

Implications: Even without dramatic advances in life extension, baby boomers are likely to live much longer, and in better health, than anyone now expects. This will reduce the cost of health care well below most current projections, but is likely to raise dramatically the cost of Social Security, Medicare, and the few remaining fixed-benefit pension plans.

High development and production costs for designer pharmaceuticals, computerized monitors, and artificial organs will continue to push up the cost of health care far more rapidly than the general inflation rate. Much of these expenses will be passed on to Medicare and other third-party payers.

Severe personnel shortages can be expected in high-tech medical specialties, in addition to the continuing deficit of nurses.

30 The Internet is growing logarithmically and globally.

• Net users now number around 500 million worldwide; various forecasts put that figure at between 709 million and 946 million by 2005.

• One reason for this fast growth is the rapid expansion of Net connectivity in some developing lands. India had only 170,000 Net subscribers in 1998; by mid-2000, it had 1 million, and in 2003, no fewer than 23 million Indians are expected to use the Internet.

• China's population of Net users is growing by 6% per month, to an estimated 33 million users in 2003.

• As of mid-2002, some 26 million households in Japan had computers and used them to access the Internet, up from 12.5 million in early 2001. Nearly 60 million people—about half of Japan's population—access the Internet via computers, cell phones, and other devices.

• Most Internet communication is

MANSFIELD COMMUNICATIONS / PR NEWSWIRE PHOTO SERVICE

Cyber-bar? Interactive Web camera service StellaCam offers an online pub crawl, allowing this beer lover in San Francisco to toast friends in Brussels.

Trend 30

commercial, business-to-business, rather than personal e-mail.

• Internet-based commerce is growing rapidly. Total online consumer sales, excluding auctions, reached $6 billion in July 2002; about half of that went to online travel services.

• In 2000, only 500,000 Iranians had access to the Internet. By mid-2002, that number was estimated at 1.75 million and was expected to grow to at least 5 million in the next five years.

Implications: Americans made up 42% of the total Net-using population in 2000, dropping to less than 37% in 2003.

Estimated world savings in business expenses thanks to B2B sales and services on the Internet: $1.3 trillion by 2002. Total B2B sales on the Net will reach $3.95 trillion in 2003, up from only $403 billion in 2000.

Internet-based operations require more sophisticated, knowledgeable workers. Once the current economic downturn is clearly over, people with the right technical training will find a ready market for their services in the next 15 years, as major businesses compete to hire them.

Cultural, political, and social isolation has become almost impossible. Even China's attempts to filter the Internet and shield its population from outside influences have proved ineffective, as "hackers" elsewhere provide ways to penetrate the barrier. Similar Iranian efforts have been even less successful.

Trends in Labor Force and Work

31 Education and training are expanding throughout society.

• Approximately 130,000 additional K-12 teachers will be needed in the United States between 2000 and 2010, according to the National Center for Educational Statistics.

• Also needed: An annual $10 billion increase in federal spending for programs such as Head Start, aid for disadvantaged children, the Job Corps, and the Job Training Partnership Act.

• The half-life of an engineer's knowledge today is only five years; in 10 years, 90% of what an engineer knows will be available on the computer. In electronics, fully half of what a student learns as a freshman is obsolete by his or her senior year.

• Eighty-five percent of the information in National Institutes of Health computers is upgraded in five years.

• Rapid changes in the job market and work-related technologies will necessitate increased training for virtually every worker.

• In the next 10 years, close to 10 million jobs will open up for professionals, executives, and technicians in the highly skilled service occupations.

• A substantial portion of the labor force will be in job retraining programs at any moment. Much of this will be carried out by current employers, who have come to view employee training as a good investment.

• Schools will train both children and adults around the clock. The academic day will stretch to seven hours for children; adults will use much of their remaining free time to prepare for their next job.

• We already are seeing a trend toward more adult education. One reason is the need to train for new careers as old ones are displaced or boomers grow bored with them. The other is the need of healthy, energetic people to keep active during retirement.

• In the United States, education is moving rapidly to the Internet, as small, rural grammar and high schools supplement their curricula with material from larger institutions, while universities increasingly market their programs to distant students.

Implications: Even small businesses must learn to see employee training as an investment rather than an expense. Motorola estimates that it reaps $30 in profits for each dollar it spends on training.

Both management and employees must get used to the idea of lifelong learning. It will become a significant part of work life at all levels.

As the digital divide is erased and minority and low-income households buy computers and log onto the Internet, groups now disadvantaged will be increasingly able to educate and train themselves for high-tech careers.

32 Specialization is spreading throughout industry and the professions.

• For doctors, lawyers, engineers, and other professionals, the size of the body of knowledge required to excel in a particular area precludes excellence across all areas.

• The same principle applies to artisans. Witness the rise of post-and-beam homebuilders, old-house restorers, automobile electronics technicians, and mechanics trained to work on only one brand of car.

• The information-based organization depends on its teams of task-focused specialists.

• Globalization of the economy calls for the more independent specialists. For hundreds of tasks, corporations will turn to consultants and contractors who specialize more and more narrowly as markets globalize and technologies differentiate.

Implications: This trend creates endless new niche markets to be served by small businesses. It also brings more career choices, as old specialties quickly become obsolete, but new ones appear even more rapidly.

33 Services are the fastest-growing sector of the global economy.

• Retail sales in the United States grew by nearly 41% between 1995 and 2001, according to the Census Bureau. The same trend is apparent in other countries.

• Service industries accounted for 83% of private nonfarm employment in the United States in 2000, a record 95 million jobs. In the decade ending 2010, services are expected to account for virtually the entire net gain in U.S. employment.

• The U.S. health-care budget will more than double from $1.3 trillion in 2000 to $2.8 trillion by 2011, predicts the Centers for Medicare and Medicaid Services.

• The service sector employed 70% of the U.S. workforce in 1990; it soon will grow to nearly 90%. Europe and Japan are not far behind.

• Service jobs have replaced many of the well-paid positions lost in manufacturing, transportation, and agriculture. These new jobs, often part time, pay half the wages of manufacturing jobs. On the other hand, computer-related service jobs pay much more than the minimum for workers with sound education and training.

• Some of the fastest growth is in some of the least-skilled occupations, such as cashiers and retail salespersons.

Implications: Services are now beginning to compete globally, just as manufacturing industries have done over the last 20 years. By creating competitive pressure on wages in the industrialized lands, this trend will help to keep inflation in check.

The growth of international business will act as a stabilizing force in world affairs, as most countries find that conflict is unacceptably hard on the bottom line.

34 Women's salaries are beginning to approach equality with men's.

• Women's salaries in the United States grew from 61% of men's in 1960 to 74% in 1991. This figure soon will top 83%. In Japan, women's salaries are rising less rapidly, but rising nonetheless.

• In the future, women's average income could exceed men's. College graduates enjoy a significant advantage in earnings over peers whose education ended with high school. Today, some 64% of young American women enroll in college, compared with only 60% of young men.

• To the extent that experience translates as prestige and corporate value, older women should find it easier to reach upper-management positions. They will strengthen the nascent "old-girl" networks, which will help to raise the pay scale of women still climbing the corporate ladder.

Implications: More new hires will be women, and they will expect both pay and opportunities equal to those of men.

Competition for top executive positions, once effectively limited to men, will intensify even as the corporate ladder loses many of its rungs.

One-fourth of executives today, and nearly 20% of corporate board members, are women. While this is still too few, it is far more than in any previous generation, and their numbers can only grow.

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Women are gaining economic strength. Women's salaries are approaching parity with men's, and competition for the top corporate rung is intensifying.

Trend 34

35 Workers are retiring later as life expectancy stretches.

• Data from the Organization for Economic Cooperation and Development (OECD) show that people are retiring earlier in the developed world, but this is only part of the picture. Americans often return to work and delay complete retirement for several years. This trend will spread to other industrialized countries as the retirement-age population grows and the number of active workers to support them declines.

• People increasingly will work at one career, "retire" for a while (perhaps to travel) when they can afford it, return to school, begin another career, and so on in endless variations. True retirement, a permanent end to work, will be delayed until very late in life.

• In the long run, it may prove impossible to maintain the tradition of retirement, except through personal savings and investment.

• By 2010, we expect the average retirement age in the United States to be delayed well into the 70s. Benefits may also continue their decline, and they will be given based on need, rather than as an entitlement.

Implications: Since the penalty on earnings of Social Security recipients has been rescinded, more American retirees will return to work, and those not yet retired will be more likely to remain on the job.

Older workers will partially make up for the shortage of entry-level employees. The chance to remain in the workplace will reduce the risk of poverty for many elderly people who otherwise would have had to depend on Social Security to get by.

Retirees will act as technical aides to teachers, especially in the sciences.

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Older workers are not jumping ship. As life expectancy increases, expect workers to retire later—and start new careers.

Trend 35

36 Unions are losing their power.

• In the United States, unions enrolled 23% of employed wage and salary workers in 1980, but only 16% by 1995. By 2005, despite several recent successes in organizing, contract negotiations, and strikes, it will fall under 12%.

• In South Korea, where organized labor once was invincible, the government has increasingly stood up to strikes by doctors, electrical workers, car makers, and other trade groups.

• In Britain, where the Thatcher government broke union power in the 1980s, labor has recovered little of its former strength.

• One reason for this decline is that jobs now are free to move around the globe from heavily unionized areas to regions where unions are less well-established. Companies also contract out a growing proportion of business activities to nonunion firms.

• Another reason is that the increased use of robots, CAD/CAM, and flexible manufacturing complexes can cut a company's workforce by up to one-third. The surviving workers tend to be technicians and other comparatively well-educated semiprofessionals, who always have tended to resist union membership. The growing industrial use of artificial intelligence will further this trend.

• A third reason is the high cost of strikes. The once-wealthy Teamsters Union spent an estimated $15 million on its strike against UPS in 1997, leaving only $700,000 in its coffers—this after substantial borrowing from the AFL-CIO. In 2002, they settled without a strike.

• In 10 to 15 years, American labor unions will compete with AARP to lead the battle for the rights of late-life workers and for secure retirement benefits. They face an inherent conflict between the interests of workers in what once would have been the retirement years and those of younger members, who rightly see the elderly as having saddled them with the cost of whatever benefits other generations enjoy.

Implications: For large companies, this promises greater stability in employee wages and benefits.

Unions eager to regain their membership will target any substantial firm with less-skilled employees to organize. This could raise labor costs for companies that unions once would have considered too small to organize.

Democrats have been losing support from unions as organized labor declines. However, the three groups replacing unions in the power bloc—the AARP, Hispanics, and African Americans—also have tended to vote Democratic.

The old paradigm of unions vs. corporations is obsolete. In today's economy, workers negotiate alongside management, winning shared bonuses.

37 Second and third careers are becoming common, as more people make mid-life changes in occupation.

• The fast pace of technological change makes old careers obsolete, even as new ones open up to replace them.

• People change careers every 10 years, on average.

• A recent Louis Harris poll found that only 39% of workers say they intend to hold the same job five years from now; 31% say they plan to leave their current work; 29% do not know.

• Boomers and their children will have not just two or three careers, but five or six, as dying industries are replaced by new opportunities.

Implications: "Earn while you learn" takes on new meaning: Most people will have to study for their next occupation, even as they pursue their current career.

In many two-earner couples, one member or the other will often take a sabbatical to prepare for a new career.

Self-employment is becoming an increasingly attractive option, as being your own boss makes it easier to set aside time for career development. This is especially true for generations X and dot-com.

Retirement plans must be revised, so that workers can transfer medical and pension benefits from one career to the next—a change that has long been needed.

38 The work ethic is vanishing.

• Tardiness is increasing; sick-leave abuse is common.

• Job security and high pay are not the motivators they once were, because social mobility is high and people seek job fulfillment. Some 48% of those responding in a recent Louis Harris poll said they work because it "gives a feeling of real accomplishment."

• Gen X'ers watched their parents remain loyal to their employers, only to be downsized out of work. As a result, they have no corporate loyalty at all. Many will quit their job at even the hint of a better position.

• For generation X, the post-baby-boom generation, work is only a means to their ends: money, fun, and leisure.

• Fifty-five percent of the top executives interviewed in the poll say that erosion of the work ethic will have a major negative effect on corporate performance in the future.

• Ethics at the top are no better: Enron, WorldCom, Tyco International, Adelphia Cable, and ImClone just begin the list of companies under investigation for deceptive accounting practices, looting of corporate assets, and other misdeeds with dire implications for stock values.

• Seeking the root of such problems, a Zogby International poll of college seniors found that 97% said their studies had prepared them to act ethically in the future. However, 73% said professors had taught them that right and wrong are not susceptible to uniform standards, but depend on individual values and cultural norms.

Implications: The new generation of workers cannot simply be hired and ignored. They must be nurtured, paid well, and made to feel appreciated. Training is crucial. Without the opportunity to learn new skills, young people will quickly find a job that will help them to prepare for the rest of their career.

39 Two-income couples are becoming the norm.

• In 75% of U.S. households, both partners will work full time by the year 2005, up from 63% in 1992.

• The percentage of working-age women who are employed has grown steadily throughout the industrialized world. In the United States, it's grown from 46% in 1970 to 68.8% in 2000. The lowest are Italy, Spain, and Mexico, with just 40% of working-age women employed, according to the OECD.

• Look for families that usually have two incomes, but have frequent intervals in which one member takes a sabbatical or goes back to school to prepare for another career. As information technologies render former occupations obsolete, this will become the new norm.

• This emphasis on work is one big reason the richest 25% to 50% of the U.S. population has reached zero population growth. They have no time for children and little interest in having large families.

Implications: Demand for on-the-job child care, extended parental leave, and other family-oriented benefits can only grow. In the long run, this could erode the profitability of some American companies, unless it is matched by an equal growth in productivity.

Two-career couples can afford to eat out often, take frequent short vacations, and buy new cars and other such goods. And they feel they deserve whatever time-savers and outright luxuries they can afford. This is quickly expanding the market for consumer goods and services, travel, and leisure activities.

This also promotes self-employ-

Women of working age are working more. Look for a growing demand for family-friendly workplace policies, as well as working couples switching breadwinner roles back and forth.

Trend 39

ment and entrepreneurialism, as one family member's salary can tide them over while the other works to establish a new business.

40 Generations X and dot-com will have major effects in the future.

• Members of generation X, now in their 30s, and especially of generation dot-com, now in their 20s, have more in common with their peers throughout the world than with their parents' generation.

• There are approximately 50 million people in Europe between the ages of 15 and 24; 30 million more are between 25 and 29. The under-30 cohort represents about 22% of the European population.

• The under-20 cohort is remaining in school longer and taking longer to enter the workforce than before.

• Generation X should be renamed "generation E," for entrepreneurial. Throughout the world, they are starting new businesses at an unprecedented rate.

• The younger dot-com generation is proving to be even more business-oriented, caring for little but the bottom line. Twice as many say they would prefer to own a business rather than be a top executive. Five times more would prefer to own a business rather than hold a key position in politics or government.

• Many in generation X are economically conservative. On average, those who can do so begin saving much earlier in life than their parents did in order to protect themselves against unexpected adversity. They made money in the stock market boom of the 1990s, then lost it in the "dot-bomb" contraction, but have left their money in the market. For generations X and dot-com, time is still on their side.

Implications: Employers will have to adjust virtually all of their policies and practices to the values of these new and different generations, including finding new ways to motivate and reward them. Generations X and dot-com thrive on challenge, opportunity, and training—whatever will best prepare them for their next career move. Cash is just the beginning of what they expect.

For these generations, lifelong learning is nothing new; it's just the way life is. Companies that can provide diverse, cutting-edge training will have a strong recruiting advantage over competitors that offer fewer opportunities to improve their skills and knowledge base.

Generations X and dot-com are well equipped for work in an increasingly high-tech world, but have little interest in their employers' needs. They also have a powerful urge to do things their way.

As both customers and employees, they will demand even more advanced telecommunications and Net-based transactions.

41 Time is becoming the world's most precious commodity.

• Computers, electronic communications, the Internet, and other technologies are making national and international economies much more competitive.

• In the United States, workers spend about 10% more time on the job than they did a decade ago. European executives and nonunionized workers face the same trend.

• In this high-pressure environment, single workers and two-income couples are increasingly desperate for any product that offers to simplify their lives or grant them a taste of luxury—and they can afford to buy it.

Time is becoming ever more precious. Stress-related problems may increasingly cut into companies' productivity.

Trend 41

Implications: Stress-related problems affecting employee morale and wellness will continue to grow. Companies must help employees balance their time at work with their family lives and need for leisure.

As time for shopping continues to evaporate, Internet and mail-order marketers will have a growing advantage over traditional stores.

Management Trends

42 More entrepreneurs start new businesses every year.

• Workers under 30 would prefer to start their own company, rather than advance through the corporate ranks. Some 10% are actively trying to start their own businesses, three times as many as in previous generations.

• A large majority simply distrust large institutions. Most believe that jobs cannot provide a secure economic future in a time of rapid technological change. Examples of Silicon Valley start-ups that turned their founders into billionaires "overnight" dramatically advanced this change of values. This attitude seems to have been moderated only slightly by the failure of many dot-com companies.

• By 2006, the number of self-employed people in the United States will rise to 10.2 million, according to the Bureau of Labor Statistics. However, Forecasting International believes that figure to be too low: Expect closer to 12 million self-employed Americans in 2006.

• More women also are starting small businesses. Many are leaving traditional jobs to go home and open businesses, even as they begin a family.

• Since the 1970s, small businesses started by entrepreneurs have accounted for nearly all of the new jobs created. For much of this period, giant corporations have actually cut employment. In 1995, small, entrepreneurial businesses produced 1 million new full-time jobs vs. barely 100,000 among larger companies.

• By 2005, 80% of the labor force will be working for firms employing fewer than 200 people.

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Self-employment is the work option of choice for growing numbers of younger workers.

Trend 42

Implications: This is a self-perpetuating trend, as all those new service firms need other companies to handle chores outside their core business.

It is driven as well by the attitudes and values of generations X and dot-com and by the rapid developments in technology, which create endless opportunities for new business development.

Specialty boutiques will continue to spring up on the Internet for at least the next 20 years.

43 Information-based organizations are quickly displacing the old command-and-control model of management.

• The typical large business is struggling to reshape itself. Soon, it will be composed of specialists who rely on information from colleagues, customers, and headquarters to guide their actions.

• Management styles will change as upper executives learn to consult these skilled workers on a wide variety of issues. Employees will gain new power with the authority to make decisions based on the data they develop.

• Information-based organizations require more specialists, who will be found in operations, not at corporate headquarters. R&D, manufacturing, and marketing specialists will work together as a team on all stages of product development rather than keeping each stage separate and distinct.

• Upper management will no longer give detailed orders to subordinates. Instead, it will set performance expectations for the organization, its parts, and its specialists and supply the feedback necessary to determine whether results have met expectations.

Implications: This is a well-established trend. At this point, many large corporations have restructured their operations for greater flexibility. However, many others still have a long way to go.

Downsizing has spread from manufacturing industries to the service economy. Again, this process encourages the entrepreneurial trend, both to provide services for companies outsourcing their secondary functions and to provide jobs for displaced employees.

Many older workers have been displaced in this process, depriving companies of their corporate memory. Companies have replaced them with younger workers, whose experience of hard times is limited to the relatively mild recession since 2000. Many firms may discover that they need to recruit older workers to help them adapt to adversity.

44 A typical large business in 2010 will have fewer than half the management levels of its counterpart in 1990, and about one-third the number of managers.

• Computers and information-management systems have stretched the manager's effective span of control from six to 21 subordinates. Information now flows from front-line workers to higher management for

analysis. Thus, fewer mid-level managers are needed, flattening the corporate pyramid.

• Downsizing, restructuring, reorganization, outsourcing, and cutbacks of white-collar workers will continue through 2006.

• Opportunities for advancement will be few because they will come within the narrow specialty. By 2001, only one person for every 50 was promoted, compared with one for every 20 in 1987.

• Information-based organizations will have to make a special effort to prepare professional specialists to become business executives and leaders.

Implications: Top managers will have to be computer-literate to retain their jobs and must make sure they achieve the increased span of control that computers make possible.

Finding top managers with the broad experience needed to run a major business already has become difficult and can only grow more so as the demand for specialization grows.

Executives increasingly will start their own companies, rather than trusting the old-fashioned corporate career path to provide advancement.

45 Government regulations will continue to take up a growing portion of the manager's time and effort.

• Since the U.S. Congress passed regulatory reform laws in 1996, more than 14,000 new regulations have been enacted. Not one proposed regulation was rejected during this period. The *Federal Register*, where proposed and enacted regulations are published, was nearly 50% larger in 1998 than it had been 10 years earlier—50,000 pages in all.

• This is not solely an American trend. The Brussels bureaucrats of the European Union are churning out regulations at an even faster rate, overlaying a standard regulatory structure on all the national systems of the member countries.

Implications: Regulations—though both necessary and unavoidable—amount to a kind of friction that slows both current business and future economic growth. Their proliferation in the developed world could give a competitive advantage to countries such as India and China, where regulations governing investment and capital flow are being stripped away, while health, occupational safety, and environmental codes are still rudimentary or absent. Other lands, such as Russia, will remain at a competitive disadvantage until they can pass and enforce the regulations needed to ensure a stable, fair business environment.

AUDIOVISUAL LIBRARY EUROPEAN COMMISSION

Hemicycle of the European Parliament, Brussels, where legislators are churning out regulations at a pace matching their U.S. counterparts.

Trend 45

Institutional Trends

46 Multinational corporations are uniting the world—and growing more exposed to its risks.

• By 2005, parts for well over half of the products built in the United States will originate in other countries.

• Multinational corporations that rely on indigenous workers may be hindered by the increasing number of AIDS cases in Africa and around the world. Up to 90% of the population in parts of sub-Saharan Africa reportedly tests positive for the HIV virus in some surveys. Thailand is equally stricken, and many other parts of Asia show signs that the AIDS epidemic is spreading among their populations.

• The continuing fragmentation of the post–Cold War world has reduced the stability of some lands where government formerly could guarantee a favorable—or at least predictable—business environment. The current unrest in Indonesia is one example.

• One risk now declining is the threat of currency fluctuations. In Europe, at least, the adoption of the euro is making for a more stable economic environment.

Implications: It is becoming ever more difficult for business to be confident that decisions about plant location, marketing, and other critical issues will continue to appear wise even five years into the future. All long-term plans must include an even greater margin for risk management. This will encourage outsourcing, rather than investment in offshore facilities that could be endangered by sudden changes in business conditions.

Countries that can demonstrate a significant likelihood of stability will enjoy a strong competitive advantage over neighbors that cannot. Witness the rapid growth of investment in India now that deregulation and privatization have general political support, compared with other Asian lands where conditions are less predictable.

Major corporations also can help

AUDIOVISUAL LIBRARY EUROPEAN COMMISSION

Euro currency gets action in the market. Eliminating risks caused by currency fluctuations, Europe may become a more stable economic environment.

Trend 46

to moderate some risks in unstable countries, such as by threatening to take their business elsewhere.

47 This international exposure includes a greater risk of terrorist attack.

• State-sponsored terrorism appears to be on the decline, as tougher sanctions make it more trouble than it is worth. However, some rogue states may still provide logistical or technological support for independent terrorist organizations when opportunities present themselves.

• Thus far, attacks on American companies have been limited to rock-throwing at the local McDonalds, occasional bombings of bank branches and of American-owned pipelines in South America, and kidnappings.

• But if American government facilities overseas are effectively hardened against terrorist assault, corporate facilities are likely to be attacked instead.

• Nothing will prevent small, local political organizations and special-interest groups from using terror to promote their causes.

• However, as the United States has just recognized, the most dangerous terrorist groups are no longer motivated by specific political goals, but by generalized, virulent hatred based on religion and culture.

• On balance, the amount of terrorist activity in the world is likely to go up, not down, in the next 10 years.

• Risks of terrorism are greatest in countries with repressive governments and large numbers of unemployed, educated young men.

Implications: Western corporations may have to devote more of their resources to self-defense, while accepting smaller-than-expected profits from operations in the developing countries.

Like the attacks on the World Trade Center and Pentagon, and the American embassies in Kenya and Tanzania before them, any attacks on major corporate facilities are likely to be designed for maximum destruction and casualties. Bloodshed for bloodshed's sake has become a characteristic of modern terrorism.

Where terrorism is most common, countries will find it impossible to attract foreign investment, no matter how attractive their resources.

Though Islamic terrorists form only a tiny part of the Muslim community, they have a large potential for disruption throughout the region from Turkey to the Philippines. Although al Qaeda has demonstrated its ability to wreak havoc halfway across the world, the risks are greatest in the oil-rich Arab countries, where Islamic extremists have highjacked the faith and few who cling to traditions of peace and tolerance dare to speak out against them.

48 Consumers increasingly demand social responsibility from companies and each other.

• Companies increasingly will be judged on how they treat the environment. For example, nuclear power plant controversies are now seen in the light of the Chernobyl nuclear accident.

• Safety testing of children's products also enforces corporate responsibility. One company recently was forced to recall no fewer than 7 million child car seats.

• Government intervention will supplant deregulation in the airline industry (in the interest of safety and services), financial services (to control instability and costs), electric utilities (nuclear problems), and the chemical industry (toxic wastes).

• With 5% of the world's population and 66% of the lawyers on the planet, American citizens will not hesitate to litigate if their demands are not met.

Implications: For industry, this represents one more powerful pressure to adopt environmentally friendly technologies, to work with area schools and community groups, and to participate in other local activities. It also represents an opportunity to market to environmentally concerned consumers.

As the Internet spreads Western attitudes throughout the world, environmental activists in other regions will find ways to use local court systems to promote their goals. Litigation is likely to become a global risk for companies that do not make the environment a priority.

49 On average, institutions are growing more transparent in their operations and more accountable for their misdeeds.

• China, rated by PricewaterhouseCoopers as the most opaque of the major nations, was forced to open many of its records as a precondition for joining the World Trade Organization.

• In India, a country generally regarded as one of the world's most corrupt, the Central Vigilance Commission has opened the country's banking system to more-effective oversight.

• In the United States, powerful forces are inspiring demands for greater transparency and accountability in large institutions. These include both the current wave of business scandals and the controversy over child abuse within the Catholic Church.

Opacity of Selected Countries

	Corruption	Accounting	Regulatory
Most Open	Singapore	USA	Singapore
	USA	Italy	USA
	Italy	Singapore	South Africa
	Taiwan	Taiwan	Italy
	South Africa	Brazil	Taiwan
Most Opaque	Kenya	China	Russia
	Russia	South Korea	China

Source: From the Opacity Index, PricewaterhouseCoopers, www.opacity.com.

Corruption and opacity rankings of selected countries based on the clarity of accepted accounting and regulatory practices.

Trend 49

• The wave of support for government since the September 11 terrorist attacks has made Americans willing to accept greater transparency—that is, less privacy—in their personal lives.

• At the same time, in a countertrend that may prove temporary, the nationalist response to September 11 appears to have muted most demands for transparency in the American government.

• Wars against terrorism, drug trafficking, and money laundering are opening the world's money conduits to greater scrutiny. It is also opening up the operations of nongovernmental organizations that function primarily as charitable and social-service agencies but are linked to terrorism as well.

Implications: Countries with high levels of transparency tend to be much more stable than more-opaque lands.

They also tend to be much more prosperous, in part because they find it easier to attract foreign investment.

Greater transparency seems likely to reduce the operational effectiveness of the world's drug traffickers and terrorist organizations.

50 Institutions are undergoing a bimodal distribution: The big get bigger, the small survive, and the midsized are squeezed out.

• By 2005, 20 major automakers around the world will hold market shares ranging from 18% (GM) to 1% (BMW). By 2010, there will be only five giant automobile firms. Production and assembly will be centered in Korea, Italy, and Latin America.

• By 2005, just three major corporations will make up the computer hardware industry: IBM, Compaq, and Dell.

• Seven domestic airlines in the United States today control 80% of the market, leaving the smaller domestic carriers with only 20%. The most recent consolidation is the alliance between Continental and Northwest. By 2005 there will be only three major domestic carriers.

• Where local regulations allow, mergers and acquisitions are an international game. Witness the takeover of Chrysler by Daimler-Benz. The continuing removal of trade barriers among EU nations will keep this trend active for at least the next decade.

• Manufacturers often sell directly to the dealer, skipping the wholesaler or distributor.

• We are now in the second decade of the microsegmentation trend, as more and more highly specialized businesses and entrepreneurs search for narrower niches. These small firms will prosper, even as mid-sized, "plain vanilla" competitors die out. This trend extends to nearly every endeavor, from retail to agriculture.

• This trend leads us to believe that AT&T may be reconsolidated by 2010.

• "Boutique" businesses that provide entertainment, financial planning, and preventive medical care for aging baby boomers will be among the fastest-growing segments of the U.S. economy.

Implications: Thus far, industries dominated by small, regional, often family-owned companies have been relatively exempt from the consolidation now transforming many other businesses. Takeovers are likely even in these industries in the next decade.

This consolidation will extend even to Internet-based businesses, where well-financed companies will try to absorb or out-compete tiny online start-ups, much as they have done in the brick-and-mortar world.

No company is too large to be a takeover target if it dominates a profitable market or has other features attractive to profit-hungry investors. □

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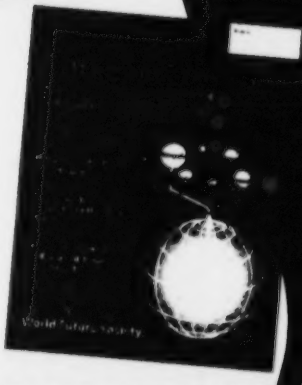

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